WATER RESOURCES RESEARCH GRANT PROPOSAL

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Principal Investigator:
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Abstract

Under the 1922 Colorado River Compact, 7.5 million acre-feet (ac-ft) of Colorado River water was allocated to the lower basin states of Nevada (300,000 ac-ft), Arizona (2.8 million ac-ft), and California (4.4 million ac-ft). Until the mid-1990s, though, California's average use was more in the neighborhood of 5.2 million ac-ft. Increased demands for water in Nevada and Arizona resulted in California being mandated to reduce its share down to its legally designated amount. While California's appropriative water use rights indicate that Southern California urban suppliers and users could be required to bear the brunt of these reductions, attention shifted towards "enticing" the agricultural sector, mostly in the Imperial Valley, to accept responsibility. The current agreement, referred to as the Quantification Settlement Agreement and signed by representatives from local, state, and federal agencies, consists of commitments associated with water conservation measures, water transfers, and groundwater banking and conjunctive use measures. The state of California was given 15 years to achieve these commitments, many of which rely upon agricultural growers in the region reducing their long-term historical average water use by nearly 30% (Western Water 2001, p. 8), and one that includes a controversial 200,000 ac-ft transfer of water from the Imperial Irrigation District to the San Diego County Water Authority.

It is the objective of this research to evaluate the ability of growers in the Imperial Valley to meet these commitments. By developing a detailed regional mathematical programming model of Imperial Valley agricultural production, we can evaluate the impacts associated with alternative strategies that meet these commitments on agricultural productivity and sustainability. Furthermore, by linking this agricultural production model to a comprehensive regional model of economic activity (using what is referred to as social accounting matrix multiplier analysis, or SAM), the impacts on regional economic activity (e.g., employment, income, profits) can also be explored and highlighted. Given that agriculture is perhaps the largest industry within the region, including the impacts of alternative agricultural management strategies on the region as a whole can provide a more comprehensive analysis than agricultural production models alone, and can better identify more efficient alternatives and their distributional consequences. Finally, through establishing a relationship between agricultural runoff from the Valley and inflows into the Salton Sea, the implications of these various management strategies on the volume, surface area, and depth of the Salton Sea can be explored. Indeed, particular constraints on required inflows into the Salton Sea can be included in the model so as to mimic conditions associated various proposed restoration plans for preserving the Salton Sea. Alternatively, the economic impacts from such restoration plan alternatives (from inflow requirements) on both agricultural productivity and regional economic activity can be evaluated.

Through development of the agricultural production model, the SAM, and their linkages amongst one another and with the Salton Sea, the impacts of alternative management strategies associated with meeting current and future water use commitments on agriculture, industry, employment, income, and the environment in the region can be investigated in a timely and objective manner.